



Ground beetles in Swiss oilseed rape fields and adjacent mowed meadows (Coleoptera: Carabidae)

Teodora Teofilova*, Daniel Ston

*oberon_zoo@abv.bg

Introduction

This study aimed at clarifying species composition and ecological structure of ground beetles associated with the oilseed rape (*Brassica napus* L.) during its flowering, ripening and after the harvest, and the adjacent mowed dry grasslands in the Swiss Jura, as well as to compare carabid coenoses of the both types of habitats.

Material

The material on which this study is based is the outcome of fieldwork carried out in 2017 in 8 localities in the Swiss Jura (cantons of Argovia and Solothurn), Switzerland. Pitfall traps (5 in each site) were set in 16 sampling sites (8 rapeseed fields and 8 grasslands). The traps were made of 500 ml. beakers, buried at the level of the substrate and filled with salt and 6% acetic acid saturated solution (with small amount of dishwasher detergent). Sampling periods were three for both the rape fields and pastures. All specimens are stored in the Institute of Biodiversity and Ecosystem Research (BAS, Sofia).

Results

We collected 11549 adult carabid specimens. They belonged to 60 species from 29 genera and 16 tribes.

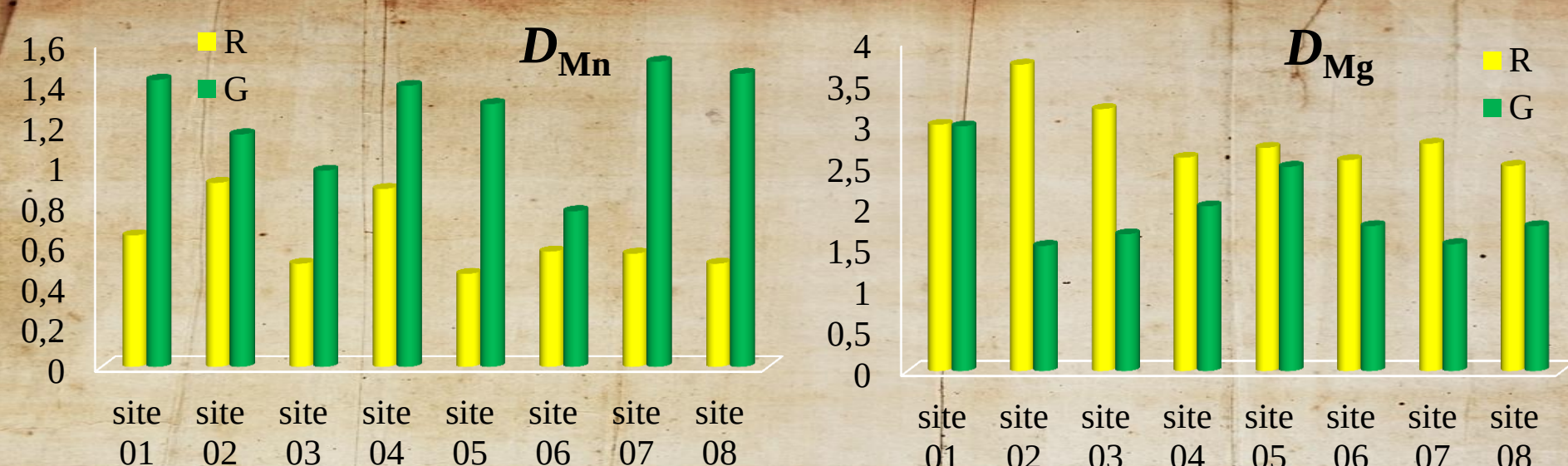
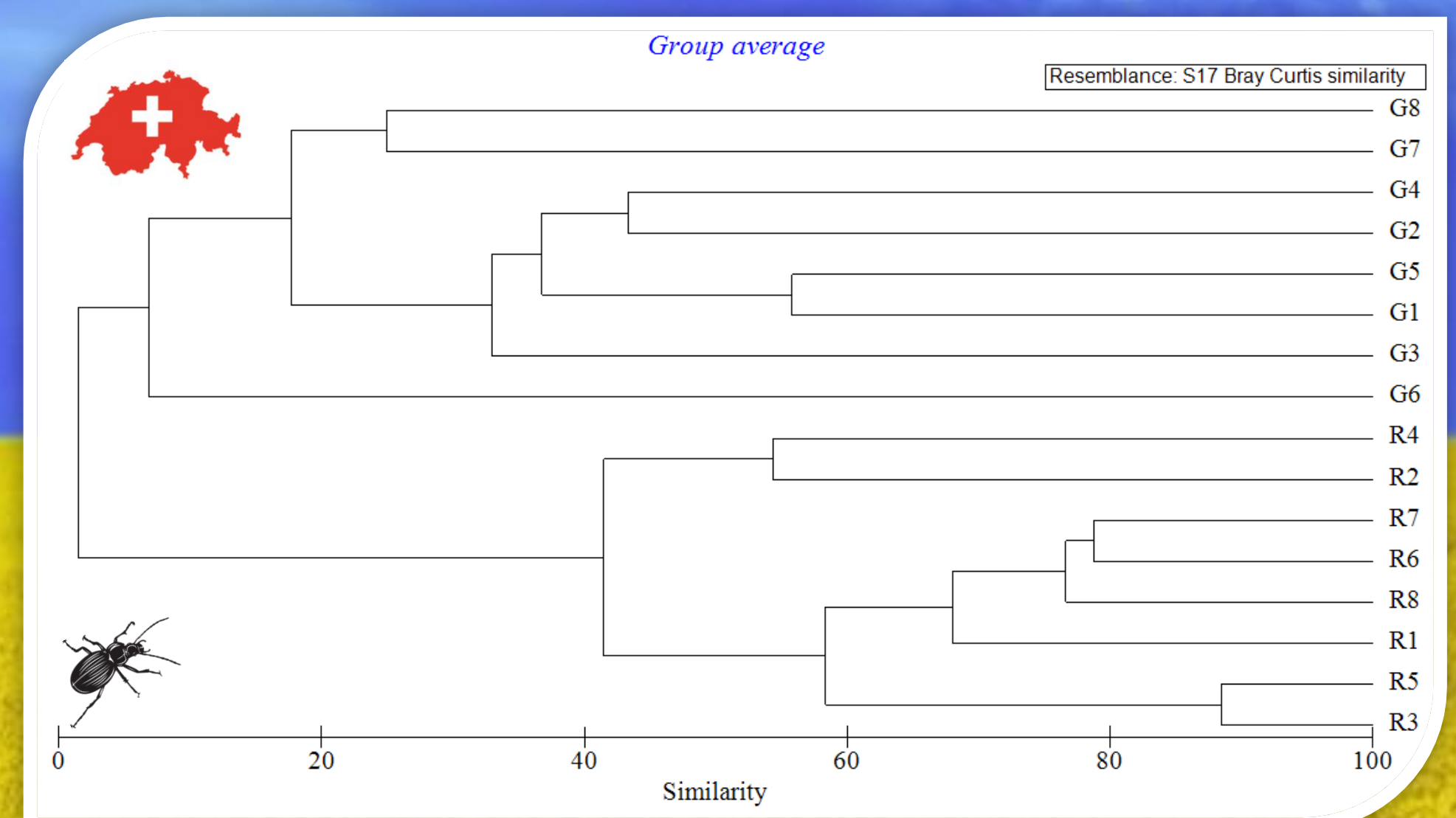
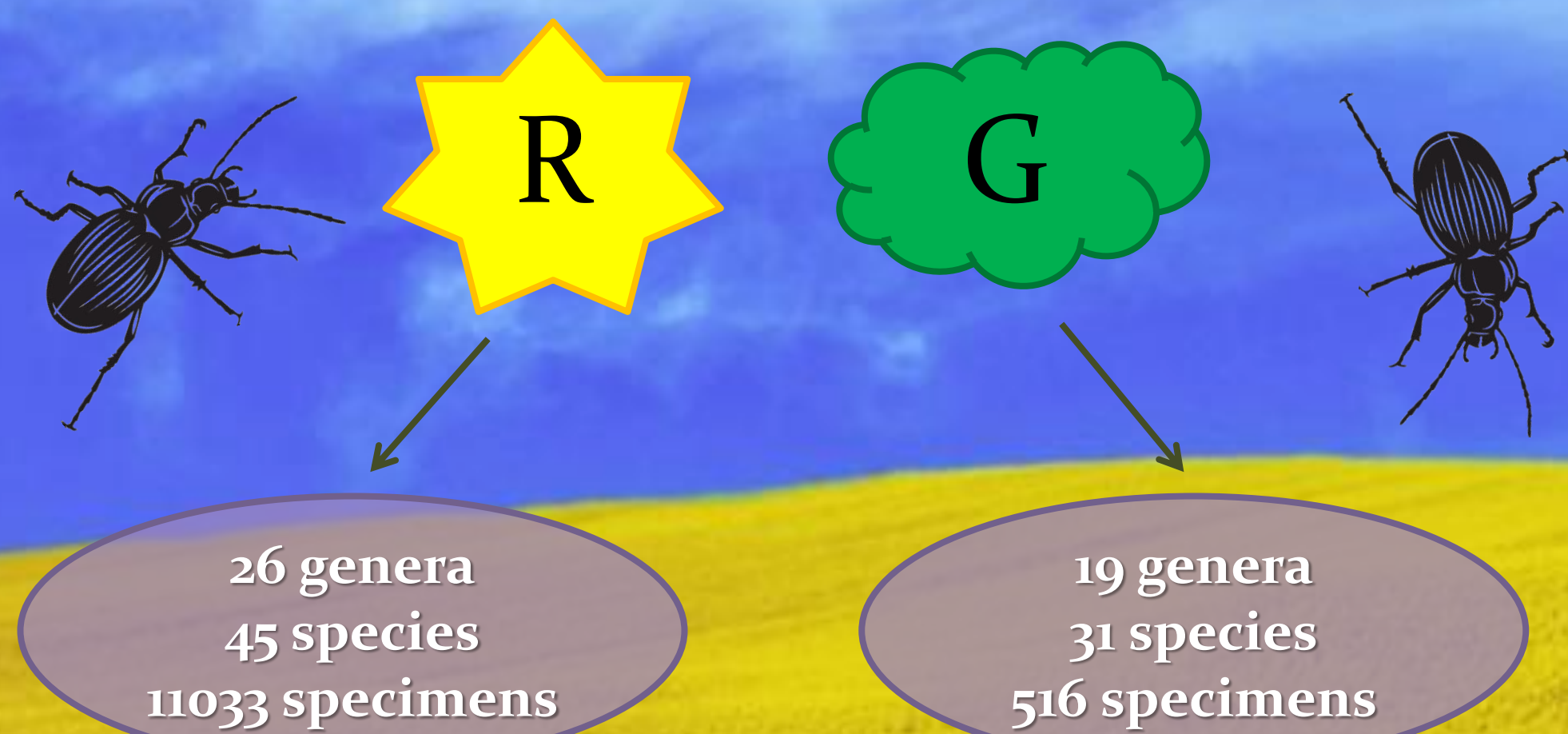
The richest tribes were Harpalini (17 species), Pterostichini (8 species), Amarini (7 species), Bembidiini and Carabini (6 species each).

The most species-rich were genera *Harpalus* (11 species), *Amara* (7 species), and *Carabus* (6 species).

Specific to the rapeseed fields were 29 species, and to grasslands – 15 species; 16 species were common for both types of habitats.

Dominance structure of the ground beetles found in both types of habitats

D = (n _i /N)·100%	Oilseed rape fields		Pastures	
	Species	No	Species	No
Eudominant > 10%	<i>Poecilus cupreus</i>	1	<i>Calathus fuscipes</i> , <i>Carabus auratus</i> , <i>Harpalus dimidiatus</i>	3
Dominant 5–10%	<i>Amara ovata</i> , <i>Anchomenus dorsalis</i> , <i>Pterostichus melanarius</i>	3	<i>Amara aenea</i> , <i>Harpalus rubripes</i> , <i>Poecilus cupreus</i>	3
Subdominant 3–5%	-	-	<i>Carabus violaceus</i>	1
Recedent 1–3%	<i>Agonum muelleri</i> , <i>Amara similata</i> , <i>Brachinus eximius</i> , <i>Harpalus affinis</i> , <i>H. rufipes</i>	5	<i>Harpalus subcylindricus</i> , <i>Ophonus azureus</i> , <i>Parophonus maculicornis</i>	3
Subrecedent	all the rest	36	all the rest	21



Species richness in studied plots (R – rapeseed field, G – grassland)
 D_{Mn} – Menhinick's species richness index; D_{Mg} – Margalef's index

In the rapeseed fields, *Agonum muelleri*, *Amara ovata*, *A. similata*, *Anchomenus dorsalis*, *Brachinus eximius*, *Harpalus affinis*, *H. rufipes*, *Poecilus cupreus*, *Pterostichus melanarius*, and *Trechus quadristriatus* were constant species found in all sampling sites.

In the grasslands, such euconstant species were missing.

Conclusions

Due to a various preconditions the oilseed rape seems to attract both grani- and herbivorous, and carnivorous species. The fact, that even mixophagous carabids are at least partly carnivores, and the large number of ground beetles species recorded in the rape fields within this research, present carabids' great potential in reduction of pests. Their use in the biological control could improve ecosystem conservation and sustainable development.

Further studies including analysis of different environmental factors as temperature and humidity of soil and air, precipitation, etc., or exploring the effect of insecticides and management practices on carabid assemblages, both in agroecosystems and grasslands, would provide valuable information about the connections and coexistence of ground beetles under different environmental conditions.